

A New Species and a New Variety of *Asiasarum* (Aristolochiaceae) from Korea

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(Received on October 27, 1995)

Asiasarum sieboldii var. *versicolor*, a new variety of *A. sieboldii*, and *A. patens*, a new species of *Asiasarum* from Korea are described. *Asiasarum sieboldii* var. *versicolor* resembles var. *sieboldii* in the floral shape, but differs from it in having smaller calyx-lobes and variegated leaves. *Asiasarum patens* is characterized by having patent and long calyx-lobes, short calyx-tubes and long stylar protuberances.

Roots and rhizomes of *Asiasarum* F. Maek. (Aristolochiaceae), called “Saishin” in Japanese, are used for natural medicine in China, Korea and Japan. Korea is one of the largest producing areas of “Saishin”. Despite the economic and medicinal importance, information concerning the distribution of *Asiasarum* species in Korea is rather poor still at present. In Korea *A. heterotropoides* var. *mandshuricum* (Maxim.) F.Maek., *A. heterotropoides* var. *seoulense* (Nakai) F.Maek., *A. maculatum* (Nakai) F.Maek. and *A. sieboldii* (Miq.) F.Maek. we are reported (Maekawa 1936, Lee 1979). However, we sometimes encounter specimens of commercial “Saishin” which are not identified as any of species or varieties of *Asiasarum*. In the course of our studies contributing to the understanding of distribution of *Asiasarum* species in Korea, a new species and a new variety of *Asiasarum* are found out and described.

Materials and Methods

Field studies were made two times. In 1992 eastern regions of Korea were surveyed and in 1993 western and southern regions. Plants of *Asiasarum* were col-

lected from 42 populations in Korea (Table 1; Fig. 1). From each population 10–60 individuals were collected. For accurate identification, flowers were fixed with FAA in the field, because floral structure in living condition is one of the most important diagnostic characters. Measurement of such characters as length and diameter of calyx-tube, length and width of calyx-lobe, and length of stylar protuberances were taken (Fig. 2). Herbarium specimens were also checked in the herbaria, TI and PE.

Results

Based on the observations on vegetative and reproductive characteristics, six taxa of *Asiasarum* are recognized in Korea (Table 2). Four of them are identified safely as *A. heterotropoides* var. *mandshuricum*, *A. heterotropoides* var. *seoulense*, *A. maculatum* and *A. sieboldii* which are hitherto known in Korea. Besides above four taxa the following two new taxa are found out in Korea.

1) ***Asiasarum sieboldii* (Miq.) F.Maek. var. *versicolor* Yamaki, var. nov.** [Figs. 7, 9]

A typo floribus valde minoribus foliis vulgo

Table 1. Collection data of *Asiasarum* in Korea

<i>A. heterotropoides</i> var. <i>mandshuricum</i> (Maxim.) F. Maek.		
Kyunggi-do, Namyangju-gun, Jinjip-eup, Bupyeong-ri, Kwangreung	1992.5.27	Yamaki & Pak 1004
Kangwon-do, Pyeongchang-gun, Daegwan-ryeong, Mt. Jewang-san	1992.5.28	Yamaki & Pak 1006
var. <i>seoulense</i> (Nakai) F. Maek.		
Kangwon-do, Taebaek-shi, Hwageon-dong, Ssari-jae	1992.5.29	Yamaki & Pak 1008a, b
<i>A. maculatum</i> (Nakai) F. Maek.		
Kyungsangnam-do, Namhae-gun, Sangju-myon, Mt. Keum-san	1993.4.27	Yamaki & Pak 1013a, b
Cheonlanam-do, Wando-gun, Wando-eup. Mt. Ohbong-san	1993.4.28	Yamaki & Pak 1016a, b
Cheju-do, Namjeju-gun, Namweon-eup. Seongpanak	1993.5.1	Yamaki & Pak 1019a
Cheju-do, Seogwipo-shi, Peobjeong-dong, Mt. Halla-san	1993.5.1	Yamaki & Pak 1019b
Cheju-do, Cheju-shi, Odeung-dong, Temple Kwaneum-sa	1993.5.1	Yamaki & Pak 1019c
Cheju-do, Namjeju-gun, Namweon-eup. Shinryeo-ri, Suak valley	1993.5.1	Yamaki & Pak 1019d
<i>A. sieboldii</i> (Miq.) F. Maek. var. <i>sieboldii</i>		
Kyungsangbuk-do, Kumi-shi, Namtong-dong. Mt. Keumo-san	1992.5.25	Yamaki & Pak 1001a, b, c
Kangwon-do, Donghae-shi, Samhwa-dong. Mt. Chongok-san, Mureungkaegok	1992.5.29	Yamaki & Pak 1007
Kyungsangbuk-do, Cheongsong-gun, Hyunseo-myon, Sachon-ri, Nogo-jae	1992.5.30	Yamaki & Pak 1009
Taegu-shi, Tong-gu, Tohak-dong, Mt. Palgong-san	1992.5.31	Yamaki & Pak 1011
Kyungsangnam-do, Milyang-gun, Danjang-myon, Mt. Chonhwang-san	1993.4.26	Yamaki & Pak 1012
Kyungsangnam-do, Namhae-gun, Idong-myon, Mt. Hogu-san, Temple Yongmun-sa	1993.4.27	Yamaki & Pak 1014a, b
Cheonlanam-do, Seungju-gun, Songkwang-myon, Sinpyoong-ri. Mt. Chokye-san	1993.4.27	Yamaki & Pak 1015
Cheonlanam-do, Jangseong-gun, Bukha-myon, Mt. Naejang-san, Namchang area	1993.4.29	Yamaki & Pak 1017a, b
Kyungasangnam-do, Habchon-gun, Kaya-myon, Chiin-ri. Mt. Kaya-san	1993.4.30	Yamaki & Pak 1018a, b, c
Chungcheonguk-do, Boeun-gun, Naesokni-myon, Sanae-ri. Mt. Sokni-san	1993.5.3	Yamaki & Pak 1020a
var. <i>versicolor</i> Yamaki		
Kyunggi-do, Kapyeong-gun, Ha-myon, Hapan-ri. Mt. Unak-san	1992.5.26	Yamaki & Pak 1002a, b, c, d
Kyunggi-do, Kapyeong-gun, Ha-myon, Sangpan-ri. Mt. Myeongji-san	1992.5.27	Yamaki & Pak 1003a, b, c
Kangwon-do, Weonseong-gun, Socho-myon. Mt. Chiak-san	1992.5.28	Yamaki & Pak 1005a, b
Chungcheonguk-do, Boeun-gun, Naesokni-myon, Sanae-ri. Mt. Sokni-san	1993.5.3	Yamaki & Pak 1020b, c
<i>A. patens</i> Yamaki		
Kyungsangbuk-do, Kumi-shi, Namtong-dong. Mt. Keumo-san	1992.5.25	Yamaki & Pak 1001d, e
Taegu-shi, Nam-gu, Bongduck-dong. Mt. Sanseong-san	1992.5.31	Yamaki & Pak 1010a, b
Chungcheongnam-do, Kangju-gun, Banpo-myon, Hakbong-ri, Mt. Kyaongryong-san	1993.5.4	Yamaki & Pak 1021a, b, c

versicoloris differt.

Perennial herb. Rhizome about 3 mm in diameter, bearing lots of slender roots about 1 mm in diameter. Leaves two, alternate, deciduous, petioles 5–15cm long, glabrous, blades cordate – broadly cordate in outline, acute at apex, 4–11cm long, 3–11cm broad, upper surface green usually variegated and pilose on veins, lower surface pale green and pilose on veins. Flower solitary, dark purplish brown – purplish brown, calyx-tubes round, 8–14mm in diameter, 5–10mm long, calyx-lobes three, not recurved, undulate, deltoid, acuminate at apex, 4–9mm long, 5–10mm broad, stamens 12, pistiles 6, style slightly elongated, 0.6–

1.5mm long, divided into two. Flowers in April to May.

Type: Korea, Kyunggi-do, Kapyeong-gun, Ha-myon, Hapan-ri, Mt. Unak-san, (Yamaki & Pak 1002a, 26 May 1992, holotype in TI, isotypes in the Herbarium of Tsumura Central Research Institute and the Herbarium of Kyung-Pook National University).

The specimens of this variety are listed in Table 1. All the specimens except for the holotype and one of the isotypes are kept in the herbarium of Tsumura Central Research Institute.

Japanese name: Fui-ri-usubasaishin フイリウスバサイシン

This new variety resembles var. *sieboldii* in the floral shape (Fig. 3), but differs from it in having a little smaller leaves, smaller calyx-lobes and variegated leaves (Tables 2, 3; Figs. 4, 7, 9). Although *A.*

maculatum also has variegated leaves, it bears more thick leaves and larger calyx-lobes than the new variety (Tables 2, 3; Figs. 4, 5). Plants of the new variety occur on moor or less moist slopes in deciduous forest located on the northwest or northeast side of mountains as those of other species of *Asiasarum*.

2) *Asiasarum patens* Yamaki, sp. nov. [Figs. 8, 10]

Species haec a *Asiasarum sieboldii*, *A. heterotropoides* atque *A. maculatum* calycis tubis valde brevibus, calycis lobis valde longis et patentibus, stylis longis facile distinguitur.

Perennial herb. Rhizome about 3 mm in diameter, bearing lots of slender roots about 1 mm in diameter. Leaves two, alternate, deciduous, petioles 5–20 cm long, glabrous, blades broadly cordate in outline, acute at apex, 6–12 cm long, 5–12 cm broad, upper surface green not variegated and pilose on veins, lower surface pale green and pubescent and hirsute. Flower solitary, dark purplish brown–purplish brown, calyx-tubes round, 12–16 mm in diameter, 5–8 mm long, calyx-lobes three, patent but not recurved, nearly flat, deltoid, acute at apex, 7–14 mm long, 8–15 mm broad, stamens 12, pistils 6, styles remarkably elongated, 1.8–3.2 mm long, divided into two. Flowers in April to May.

Type: Korea, Kyungsangbuk-do, Kumi-shi, Namtong-dong, Mt. Keumo-san (Yamaki & Pak 1001d, 25 May 1992, holotype in TI, isotype in the Herbarium of

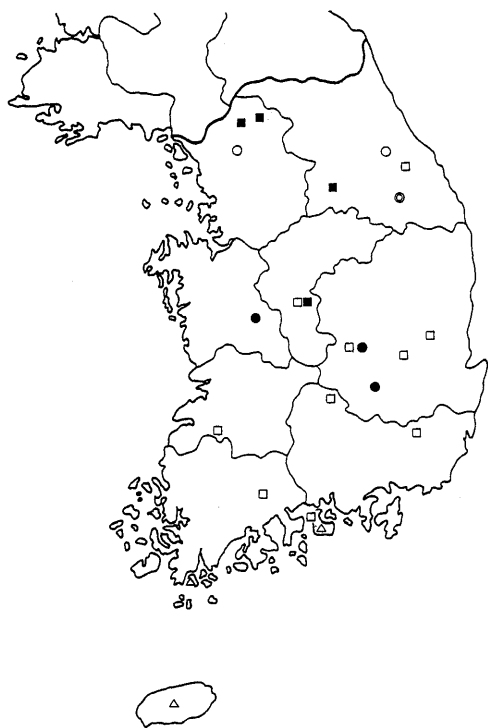


Fig. 1. Distribution range of *Asiasarum* species in Korea.

○ : *A. heterotropoides* var. *mandshuricum*. ⊙ : *A. heterotropoides* var. *seoulense*. △ : *A. maculatum*. □ : *A. sieboldii* var. *sieboldii*. ■ : *A. sieboldii* var. *versicolor*. ● : *A. patens*.

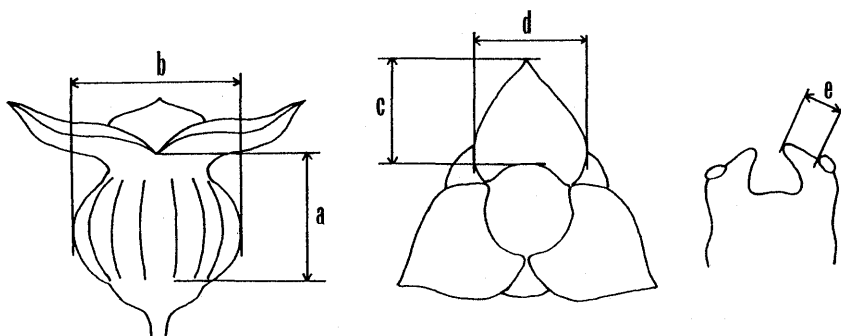


Fig. 2. Measurement of flowers. a: length of calyx-tube. b: diameter of calyx-tube. c: length of calyx-lobe. d: width of calyx-lobe. e: length of stylar protuberance.

Table 2. Diagnostic characteristics of *Asiasarum* in Korea

Taxa	Variation of leaves	Hairs on lower surface of leaves	Hairs on petioles	Calyx-lobes
<i>A. heterotropoides</i>				
var. <i>mandshuricum</i>	—	++	—	strongly recurved
var. <i>seoulense</i>	—	++	+	slightly recurved
<i>A. maculatum</i>	+	+	—	not recurved, undulate
<i>A. sieboldii</i>				
var. <i>sieboldii</i>	—	+	—	not recurved, undulate
var. <i>versicolor</i>	+	—	—	not recurved, undulate
<i>A. patens</i>	—	++	—	not recurved, nearly flat

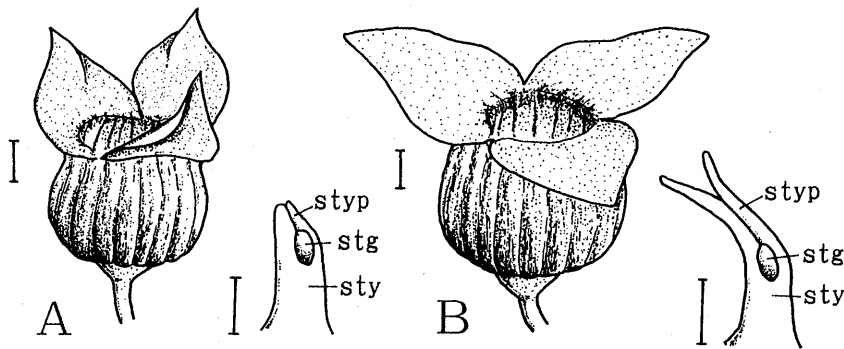


Fig. 3. Flowers and pistils of *Asiasarum sieboldii* var. *versicolor* and *A. patens*. A: *A. sieboldii* var. *versicolor*. B: *A. patens*. stg; stigma. sty; style. styp; stylar protuberance. Scale bar=1mm.

Tsumura Central Research Institute and the Herbarium of Kyung-Pook National University).

The specimens of this species are listed in Table 1. All the specimens except for the holotype and one of the isotypes are kept in the herbarium of Tsumura Central Research Institute.

Japanese name: Ohbanasaishin オオバナサイシン

Asiasarum patens is in accordance with *A. heterotropoides* var. *mandshuricum* in leaf morphology; glabrous petiole and hirsute blade on lower surface (Table 2). However, it is distinguishable from the other species and varieties in having patent and long calyx-lobes, short calyx-tubes, and long stylar protuberances (Table 3; Figs. 3, 4, 5, 6, 8, 10). Consid-

ering the distinctness in floral characters mentioned above, the treatment where *patens* is classified as a new species of *Asiasarum* is reasonable. Plants of *A. patens* also occur on more or less moist slopes in deciduous forests located on the northwest or northeast side of mountains as those of other species of *Asiasarum*.

Key to the Six Taxa of *Asiasarum* in Korea

1. Calyx-lobes recurved
 2. Calyx-lobes strongly recurved; petioles glabrous
.....*A. heterotropoides* var. *mandshuricum*
 2. Calyx-lobes slightly recurved; petioles pubes-

- cent *A. heterotropoides* var. *seoulense*
1. Calyx-lobes not recurved
 3. Calyx-lobes nearly flat; stylar protuberance 1.8–3.2mm long *A. patens*
 3. Calyx-lobes undulate and acuminate at apex; stylar protuberance 0.5–2.3mm long
 4. Leaves not variegated
..... *A. sieboldii* var. *sieboldii*
 4. Leaves variegated
 5. Leaves thin, variegation obscure in some cases; calyx-lobes 4–9mm long 4.5–10mm broad
..... *A. sieboldii* var. *versicolor*
 5. Leaves thick, variegation always clear; calyx-lobes 6–14mm long 6.5–13mm broad *A. maculatum*

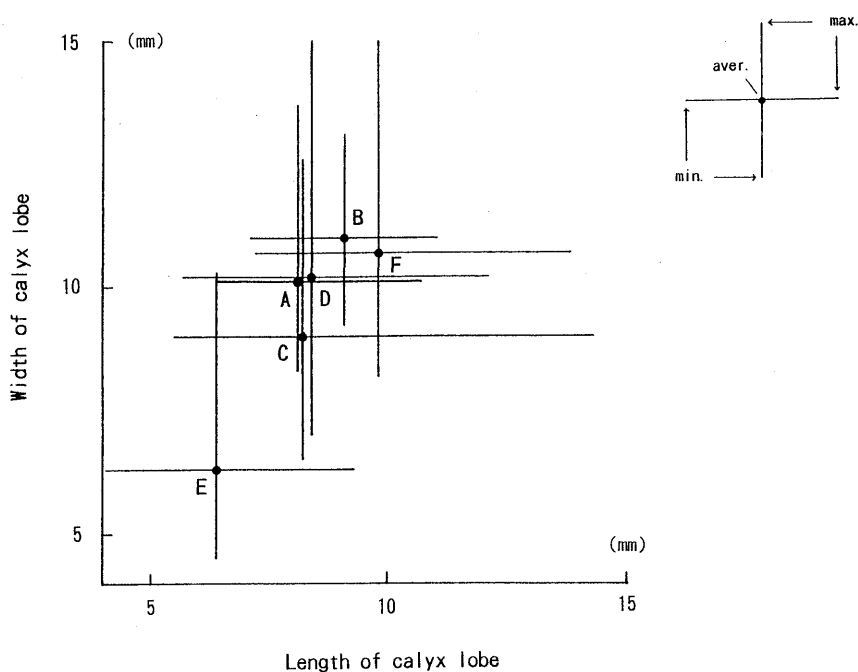


Fig. 4 Dimension of calyx-lobe in Korean *Asiasarum* species. A: *A. heterotropoides* var. *mandshuricum*. B: *A. heterotropoides* var. *seoulense*. C: *A. maculatum*. D: *A. sieboldii* var. *sieboldii*. E: *A. sieboldii* var. *versicolor*. F: *A. patens*.

Table 3. Measurement of floral organs of *Asiasarum* in Korea

	Diameter of calyx-tube (mm)	Length of calyx-tube (mm)	Length of calyx-lobe (mm)	Width of calyx-lobe (mm)	Length of stylar protuberance (mm)
<i>A. heterotropoides</i>					
var. <i>mandshuricum</i>	11.7–13.3–16.4 (± 2.0)	7.4–8.4–9.7 (± 0.9)	6.4–8.1–10.7 (± 1.4)	8.3–10.1–12.7 (± 2.1)	1.78–2.10–2.67 (± 0.29)
var. <i>seoulense</i>	11.7–12.9–14.4 (± 0.8)	7.2–8.5–9.9 (± 0.9)	7.1–9.1–11.0 (± 1.3)	9.2–11.0–13.1 (± 1.4)	1.86–2.06–2.24 (± 0.13)
<i>A. maculatum</i>	9.5–11.4–14.9 (± 1.0)	5.4–7.8–10.9 (± 1.3)	5.5–8.2–14.3 (± 2.0)	6.5–9.0–12.6 (± 1.3)	0.46–1.07–1.67 (± 0.25)
<i>A. sieboldii</i>					
var. <i>sieboldii</i>	10.5–12.4–15.6 (± 1.1)	5.6–7.9–10.0 (± 0.9)	5.7–8.4–12.1 (± 1.3)	7.0–10.2–15.0 (± 1.7)	0.75–1.42–2.27 (± 0.36)
var. <i>versicolor</i>	7.6–10.2–13.8 (± 1.1)	5.4–7.3–9.8 (± 0.8)	4.0–6.4–9.3 (± 1.1)	4.5–6.3–10.3 (± 1.0)	0.64–0.97–1.50 (± 0.17)
<i>A. patens</i>	11.7–13.3–16.4 (± 2.0)	4.6–6.5–8.3 (± 0.8)	7.2–9.8–13.8 (± 1.6)	8.2–10.7–15.0 (± 1.6)	1.82–2.41–3.23 (± 0.37)

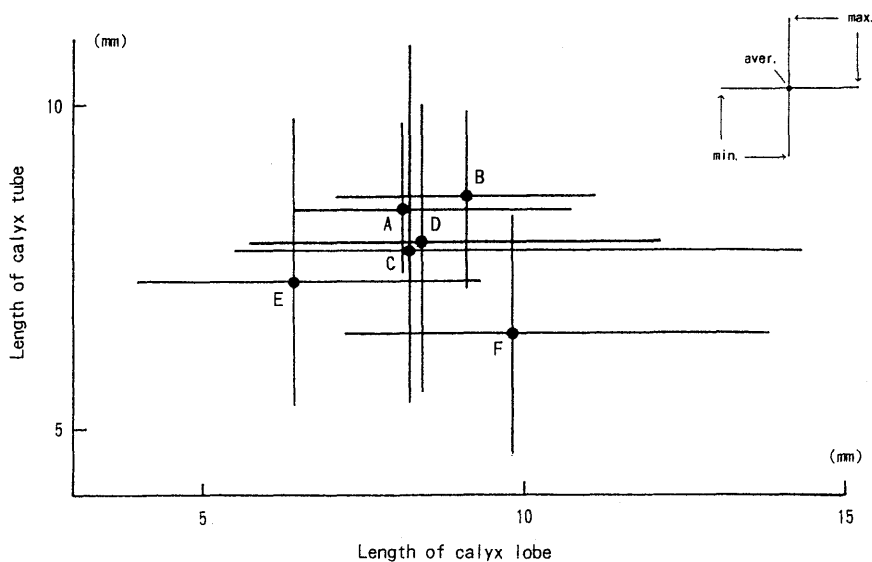


Fig. 5. Dimension of calyx-tube and calyx-lobe in Korean *Asiasarum* species. A: *A. heterotropoides* var. *mandshuricum*. B: *A. heterotropoides* var. *seoulense*. C: *A. maculatum*. D: *A. sieboldii* var. *sieboldii*. E: *A. sieboldii* var. *versicolor*. F: *A. patens*.

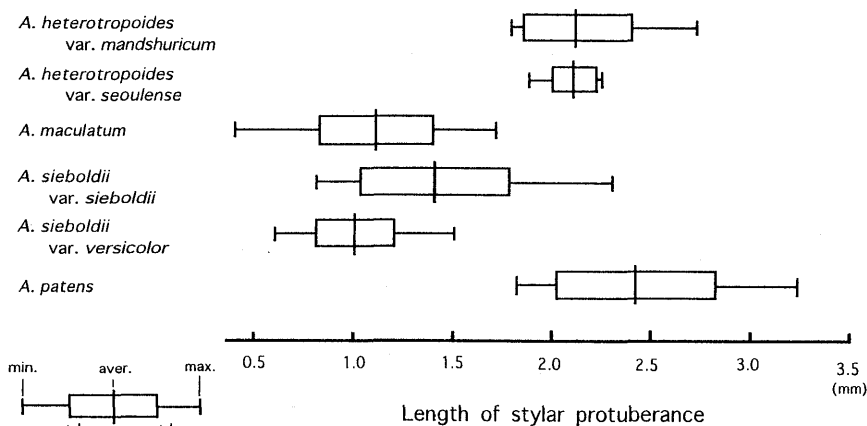


Fig. 6. Comparison of styler protuberance length in Korean *Asiasarum* species.

We would like to thank Dr. Hyong-Tak Im, Mr. Sung-Jong Kim, Ms. Kyung Choi, Ms. Young-Sil Keum, and Ms. Mi-Ja Han for their kind help in our field study. Our cordial thanks are also due to the curators of the herbaria, TI and PE.

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山木克之, 寺林 進, 岡田 稔, 朴 宰弘: 韓国産ウスバサイシン属の2新分類群

韓国に於ける生薬「細辛」の資源調査をおこなったところ、韓国には従来記載のあった、ケイリンサイシン *Asiasarum heterotropoides* var. *mandshuricum* (Maxim.) F. Maek., ウスゲサイシン *A. heterotropoides* var. *seoulense* (Nakai) F. Maek., アツバカンアオイ *A. maculatum* (Nakai) F. Maek., 及びウスバサイシン *A. sieboldii* (Miq.) F. Maek. 以外にウスバサイシンの1新変種, *A. sieboldii* (Miq.) F. Maek. var. *versicolor* Yamaki フイリウスバサイシンと1新種, *A. patens* Yamaki オオバナサイシンが分布していることが明らかとなった。これら6分類群の生育環境は同じく、いずれの分類群も広葉樹林下の北西ないしは北東の

陰湿な斜面に生育していた。

フイリウスバサイシンは、ウスバサイシンに似るが、葉身はややこぶりで縦長の傾向があり、斑が入るものが多いのが特徴である。花はウスバサイシンと同じ形であるが、萼裂片は長さ、幅とも小さく明らかに区別される。

オオバナサイシンは、葉の形状、葉身や葉柄の毛の有無等の特徴はケイリンサイシンに似るが、萼裂片がほぼ平らで平開し、萼筒に比し長く、花柱先端の突起物が長く伸びる点で明らかに他の分類群と区別される。このように花の形質でウスバサイシン属の他の種と明瞭に区別されることから、本種をウスバサイシン属の新種と考えた。

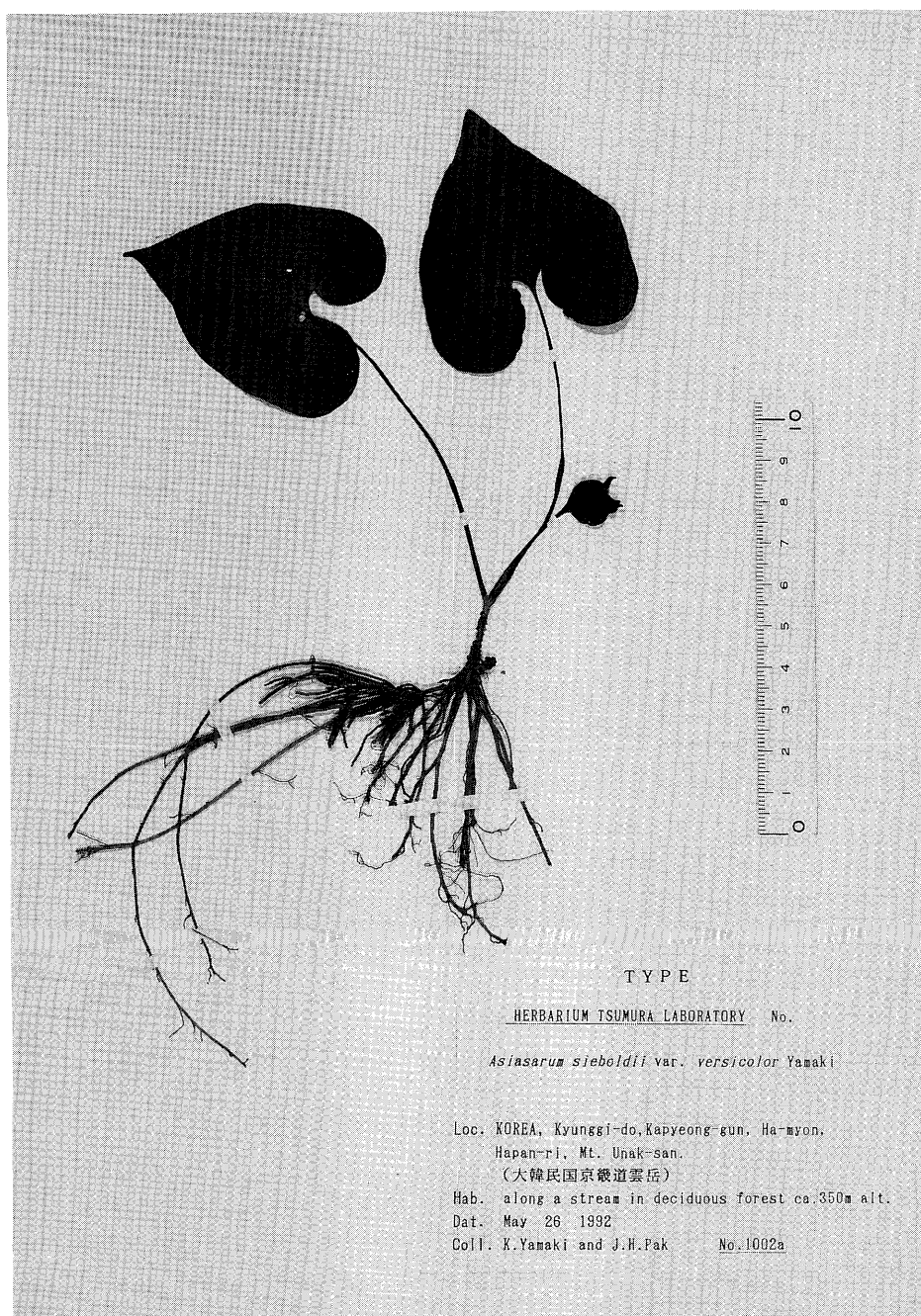


Fig. 7. Type specimen of *Asiasarum sieboldii* var. *versicolor* Yamaki.

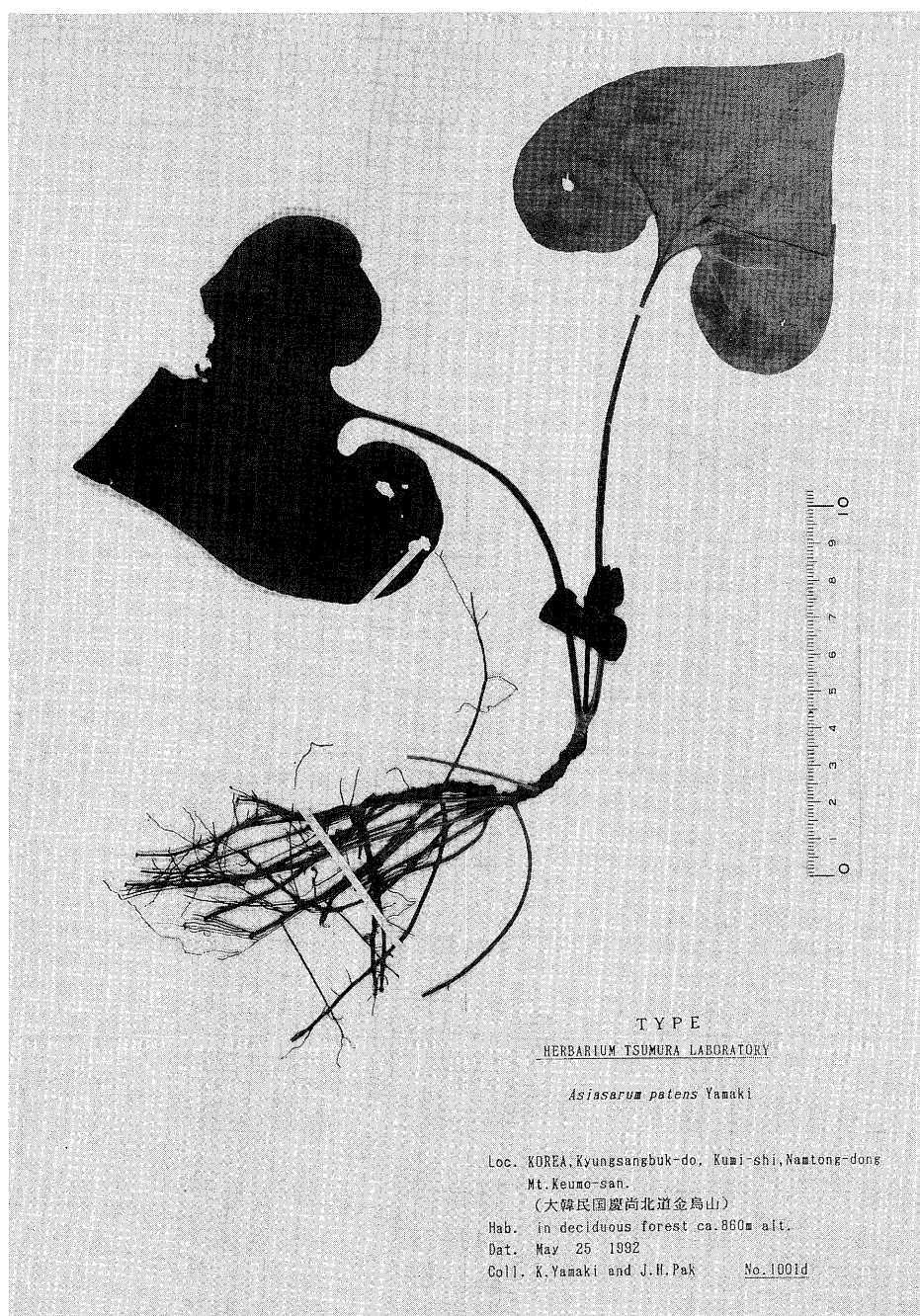


Fig. 8. Type specimen of *Asiasarum patens* Yamaki.

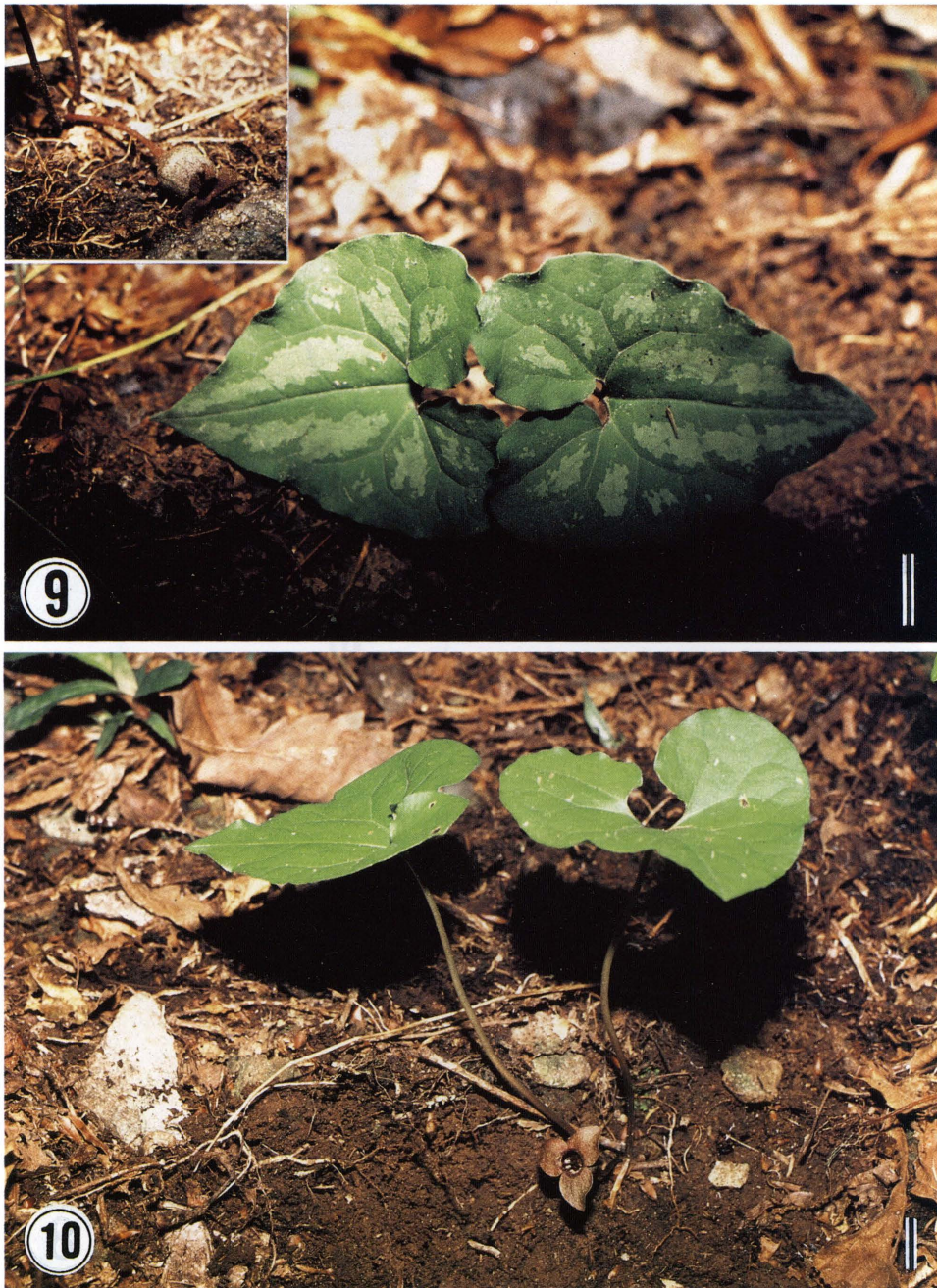


Fig. 9. *Asiasarum sieboldii* var. *versicolor*. Mt. Unak-san, Hapan-ri, Ha-myon, Kapyeong-gun, Kyunggi-do, Korea, 1992.5.26, K. Yamaki. Scale bar=1cm.

Fig. 10. *Asiasarum patens*. Mt. Keumo-san, Namtong-dong, Kumi-shi, Kyungsangbuk-do, 1992.5.25, K. Yamaki. Scale bar=1cm.